CLAIMS

1. A method for the automated production of pure SO_2 from elemental sulfur and oxygen in the presence of SO_2 CHARACTERIZED in that it is a completely regulated combustion system.

2. A method for the production of SO_2 according to claim 1 CHARACTERIZED in that the SO_2 is used as cooling and diluent agent of the reactants and comprises a fraction of the SO_2 produced in the sulfur oxidation.

3. A method for the production of SO_2 according to claim 1 CHARACTERIZED in that the oxygen not consumed during the combustion is re-entered into the sulfur combustion chamber together with the return SO_2.

4. A method for the production of SO_2 according to claims 1, 2 and 3 CHARACTERIZED in that the temperature of the sulfur combustion is controlled by maintaining a defined ratio of S, O_2 and SO_2.

5. A method for the production of SO_2 according to claim 4 CHARACTERIZED in that the S : O2 : SO2 ratio expressed in grams, entering into the combustion chamber is regulated in the range from 32 : 32.63 :243.42 to 32 : 33.6 : 262.64 and more frequently of 32 : 32.63 : 256.23.

6. A method for the production of SO_2 according to claims 1 to 5 CHARACTERIZED in that the regulation of oxygen entering into the combustion chamber is carried out based on an on line sensor of the oxygen returning to the combustion

chamber after the steps of purification and cooling, of the SO_2 produced in closed circuit.

7. A method for the production of SO_2 according to claim 6 CHARACTERIZED in that the regulation of the pure oxygen added to the return oxygen before entering into the combustion chamber is carried out based on a proportional valve controlled by the return oxygen sensor.

8. A method for the production of SO_2 according to claim 7 CHARACTERIZED in that the automated regulation system allows a control of the oxygen entering into the combustion chamber of a 2% - 5% excess relating to the stoichiometric value of S and O_2.

9. A method for the production of SO_2 according to claims 1 to 5 CHARACTERIZED in that the required amount of sulfur is controlled based on a sulfur flow sensor.

10. A method for the production of SO_2 according to claim 9 CHARACTERIZED in that according to the desired final SO_2 production the entrance of sulfur to the chamber combustion is regulated by a proportional valve controlled by a return oxygen sensor.

11. A method for the production of SO_2 according to claim 10 CHARACTERIZED in that the sulfur in liquid state is entered into the combustion chamber at a temperature between 130 and 135°C maintained by a steam produced in a multistep heat exchanger post-combustion chamber.

12. A method for the production of SO_2 according to claims 1 and 11 CHARACTERIZED in that the combustion is produced from liquid elemental sulfur in pulverized microdrop state produced in the burner combustion atomizer.

13. A method for the production of SO_2 according to claims 1 to 12 CHARACTERIZED in that the combustion chamber is maintained at a mean temperature of 1167,5°, preferably above 1100°C and under 1250°C and most preferably at 1160°C$\pm$50°C.

14. A method for the production of SO_2 according to claim 13 CHARACTERIZED in that the formed SO_2 contains small amounts of SO_3 which are absorbed countercurrent in a 98% H_2SO_4 tower.

15. A method for the production of SO_2 according to claim 13 CHARACTERIZED in that a fraction of up to 30% of the dry produced SO_2 and remaining oxygen are passed to a cool plant working between -10 and -60°C, a high part of the SO_2 comprising the final liquid SO_2 being liquefied.

16. A method for the production of SO_2 according to claim 13 CHARACTERIZED in that a fraction up to 30% of the dry generated SO_2 and remaining oxygen alternatively enter into a compression liquefaction unit working at a pressure between 3,8 and 5,0 bar and water cooler working under 32°C, allowing the liquefaction of a great part of the SO_2 comprising the final liquid SO_2.

17. A method for the production of SO_2 according to claims 8 and 15 or 16 CHARACTERIZED in that the capacity of liquefaction of SO_2 is favored by the

absence of an uncontrolled excess of oxygen mass and a higher concentration of gaseous SO_2.

18. A method for the production of SO_2 according to claim 15 or 16 CHARACTERIZED in that up to 70% of the SO_2 not passing through the cooling plant, is sent back as cooling and diluent agent to the burner of the sulfur combustion chamber, previously to mixing it with unliquefied gas SO_2, further to the remaining unreacted oxygen.

19. A method for the production of SO_2 according to claims 1 to 18 CHARACTERIZED in that the SO_2 produced has a purity above 99,90%.

20. A method for the production of SO_2 according to claim 19 CHARACTERIZED in that the elemental sulfur content is under 2 ppm.

21. A method for the production of SO_2 according to claims 19 and 20 CHARACTERIZED in that the greatest impurity detected en the final SO_2 corresponds to polycyclic aromatic hydrocarbons contained in the original sulfur.

22. A method for the production of SO_2 according to claim 21 CHARACTERIZED in that the aromatic compounds of the impurities are sulfonated after the sulfur oxidation.

23. A method for the production of SO_2 according to previous claims CHARACTERIZED in that the whole process is not environmental contaminant and energetically favored.

24. A method for the production of SO_2 according to claim 23 CHARACTERIZED in that the automated combustion control permits working in optimal conditions for the required proportion of the reactants and the safety process.

25. A method for the production of SO_2 according to claim 24 CHARACTERIZED in that the controlled energy of the process allows a higher durability of the associated equipment.

26. A method for the production of SO_2 according to claim 24 CHARACTERIZED in making possible a more rational use of the energy as a mean of generating steam either for the process itself and for other processes complementary of the production plant.